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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,272	12/16/2004	Martin S. Wilcox	CA0666	1833
3624	7590	07/16/2009	EXAMINER	
VOLPE AND KOENIG, P.C. UNITED PLAZA, SUITE 1600 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103			MALEK, LEILA	
			ART UNIT	PAPER NUMBER
			2611	
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			07/16/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/518,272	WILCOX, MARTIN S.	
	<b>Examiner</b>	<b>Art Unit</b>	
	LEILA MALEK	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 25 March 2009.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1 and 4-12 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) 12 is/are allowed.  
 6) Claim(s) 1,4-9 and 11 is/are rejected.  
 7) Claim(s) 10 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 27 November 2007 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____.   | 6) <input type="checkbox"/> Other: _____ .                        |

**DETAILED ACTION*****Response to Amendment***

1. This office action is in response to the amendments received on 03/25/2009.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As to claim 1, Applicant on lines 8-9, states "a filter configured to divide the digitized received signal into a plurality of frequency sub-bands" and then states "an analog-to-digital converter configured to digitize the signal in each sub-band". The second limitation implies that the output of the filter is in analog form, however the first limitation recites that the filter performs filtering on the digitized signal. Therefore the second limitation contradicts the first limitation and renders the claim vague.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 4, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (hereafter, referred as Liu) (US 6,442,195), in view of Liberti, Jr. et al. (hereafter, referred as Liberti) (US 5,550,872).

As to claim 1, Liu discloses a signal receiver (see Fig. 2. blocks 295 and 260) comprising: a processor (see block 260) configured to extract information content of a digitized received signal (i.e. the output of block 295) (see claim 70), a digitizer (see block 295) configured to digitize a received signal and wherein the digitizer comprises: a filter configured to divide (see blocks 280A-C) the received signal into a plurality of frequency sub-bands (see column 6, last paragraph, column 7, last paragraph-column 8, second paragraph), an analog-to-digital converter (see the ADCs) configured to digitize the signal in each sub-band, a transformer configured to transform the digitized received signal into the frequency domain (see Fig. 1E, block 84, column 10, lines 6-10, and column 12, last line), and a reconstructor (see Fig. 1E, the output of FFT; Fig. 2, blocks 270 and 260; the abstract; and column 6, last paragraph) configured to concatenate (see buffer 270) in the frequency domain the digitized received signal in each sub-band thereby reconstructing the spectrum of the received signal. Liu further shows that each sub-band filter comprises a low-pass filter 283 (see Fig. 3) that is used to reject any high frequency portions of the incoming signals (see column 7, last paragraph). Therefore, because of these low-pass filters, reconstructor inherently reconstructs the spectrum of the received signal at a frequency lower than the frequency of the spectrum of the received signal prior to being divided into sub-bands. Liu discloses all the subject matters claimed in

claim 1, except that the transformers transform the digitized signal in each sub-band. Liberti discloses a radio signal receiver (See Fig. 2, blocks 108, 214, 220, 218, and 222) comprising a plurality of A/D converters (220) and parallel branch DSPs 218. Liberti further discloses that each branch DSP comprises a Fourier Transform element (see Fig. 3, block 314), wherein the FFTs convert the output of each A/D (i.e. each sub-channel) into frequency domain (see column 6, lines 8-12). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Liu as suggested by Liberti to reduce the complexity of the system (see column 2, first paragraph).

As to claim 4, Liu further discloses that the analog-to-digital converter samples the received signal in a plurality of sub-bands at a common sample rate (see column 6, lines 13-15).

As to claim 9, Liu further discloses that reconstructor selects a replica spectrum of a sub-band signal (e.g. each individual output of ADC) and a re-inverter (i.e. a shifter) for re-inverting (or shifting) the replica spectrum if the replica spectrum is inverted (displaced from its original position) (see column 8, lines 15-20).

As to claim 11, Liu further discloses a down-converter for down-converting the received signal from a transmission frequency to a lower frequency prior to the digitization by the digitizer of the received signal (see low-pass filter 283).

4. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu and Liberti, in view of Kolanek (US 2002/0027958).

As to claim 5, Liu and Liberti disclose all the subject matters claimed in claim 1, except that the analog-to-digital converter samples the received signal in a first sub-set of the sub-bands at a first sample rate, and wherein the received signal in adjacent sub-band is sampled at unequal sample rates. Kolanek, in the same field of endeavor, discloses dividing a wideband RF signal into a number of smaller sub-bands (see the abstract and paragraph 0016). Kolanek further discloses that each sub-band is in turn translated to an intermediate frequency band or baseband, and then digitized according to a sampling rate that need only be sufficiently high to capture the bandwidth of that sub-band (see the abstract and paragraph 0016). Therefore according to Kolanek each sub-band has its own sampling rate. Kolanek does not expressly disclose that adjacent sub-bands have different sampling rates. However, based on Kolanek's teaching, each sub-band has its own sampling rate that may or may not be equal to the other adjacent sub-bands. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Liu and Liberti as suggested by Kolanek to accurately sample each sub-band and increase the performance of the system.

As to claim 6, Liu and Liberti disclose all the subject matters claimed in claim 4, except that the plurality of sub-bands having a common sample rate, have a common bandwidth. Kolanek, in the same field of endeavor, discloses dividing a wideband RF signal into a number of smaller sub-bands (see the abstract and paragraph 0016). Kolanek further discloses that each sub-band is in turn translated to an intermediate frequency band or baseband, and then digitized according to a sampling rate that need only be sufficiently high to

capture the bandwidth of that sub-band (see the abstract and paragraph 0016).

Therefore according to Kolanek each sub-band might have its own sampling rate determined based on its bandwidth. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Liu and Liberti as suggested by Kolanek to accurately sample each sub-band and increase the performance of the system.

5. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu and Liberti, in view of Butash (US 2001/0036152).

As to claim 7, Liu and Liberti disclose all the subject matters claimed in claim 1, except that the analog to digital converter digitizes a plurality of sub-bands sequentially. Butash in Fig. 3 shows an analog to digital converter (see block 304) that sequentially digitizes the baseband (wideband) signal. Butash does not disclose that ADC can be placed after the sub-band filters, however, the location of ADC in the circuit disclosed by Butash is a matter of design choice and it would have been obvious to one of ordinary skill in the art at the time of invention to modify Liu and Liberti to use only one ADC as suggested by Butash to reduce the cost and size of the system and place the ADC after the sub-band filters to meet the design requirements of the system.

As to claim 8, Butash further discloses that the transformer transforms the digitized signal in a plurality the sub-bands sequentially (see Figs. 6A-6C). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Liu and Liberti, as suggested by Butash reduce the size of the system.

***Allowable Subject Matter***

6. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claim 12 allowed.

***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**.

See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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